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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/836,372	04/18/2001	Takashi Shirasuna	35.G2775	6886

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EXAMINER

JUBA JR, JOHN

ART UNIT	PAPER NUMBER
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2872

DATE MAILED: 10/28/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/836,372

Applicant(s)

SHIRASUNA, TAKASHI

Examiner

John Juba

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 28 July 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-12 and 35-47 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 1-12, 35-38, and 40-47 is/are allowed.
- 6) ☒ Claim(s) 39 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 39 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yamanishi (U.S. Patent number 6,094,313) in view of Official notice. Referring to the third example (Fig. 3), the associated table and text, Yamanishi discloses a zoom lens system comprising strictly four lens units arranged (+)(-)(+)(-) from the object side, each of the lens units moving toward the object side upon zooming from the wide-angle end to the telephoto end. Yamanishi teaches that even in such cases where the design is well corrected, it is possible and may be *desirable* to enhance correction of aberrations by inclusion of a diffractive optical element (DOE) (Col. 3, lines 9 – 15). In particular, Yamanishi teaches that at least chromatic aberration should be corrected *at each group*, and that a suitable means to do so would be by inclusion of a DOE (Col. 3, lines 58 – 67). Thus Yamanishi fairly suggests a DOE in the fourth lens unit. Thus, Yamanishi discloses the invention substantially as claimed. However, Yamanishi does not teach placement of the DOE in the fourth group on an object side surface.

The examiner takes Official notice of the fact that it was well known in the lens art, that fabrication of a diffractive surface is much easier if the base surface flat.

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However, it was also known that use of a perfectly flat surface may introduce some coma aberration. Accordingly, it was known that a more suitable base surface for a DOE will be selected as one having *some* curvature, but preferably will be a surface having a large radius of curvature. Selection of the larger radius of curvature was known to simplify manufacturing of the DOE, and accordingly reduce the cost of the corresponding element.

It would have been obvious to one of ordinary skill to locate the DOE suggested by Yamanishi in the fourth lens unit on the surface having the largest radius of curvature, in the interest of simplifying fabrication of the corresponding lens element, thus reducing cost, as was well-known. Thus, in the lens system of Figure 3 (Example 3), it appears that the first object side surface (R_{17}) in the fourth group, being the most planar would have been the obvious choice.

Allowable Subject Matter

Claims 1 – 12, 35 – 38, and 40 – 47 are allowable over the prior art. The following is a statement of reasons for the indication of allowable subject matter: The prior art, taken alone or in combination, fails to teach or to fairly suggest, in *the zoom lens system having a diffractive optical surface located on an object side surface of an optical element of the fourth unit*,

the shape of the surface closest to the image side in said fourth lens unit being convex to the image side, as recited in claim 1;

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the only lenses of the first lens unit being (1) a negative lens whose concave surface faces the object side and, (2) positive lens, in sequence from the object side to the image side, as recited in claim 35;

an aperture stop that moves with the second lens unit as a unit in zooming, as recited in claim 37;

the second lens unit having only one lens element, that element being a negative lens element, as recited in claim 38; or

the fourth unit comprising a positive lens and two negative lenses, as recited in claim 40.

Similarly, the prior art fails to teach or to fairly suggest, *in the zoom lens system having a diffractive optical surface located on a surface of the first lens unit other than a surface of the first lens unit closest to the object side,*

the second lens unit having only one lens element, that element being a biconcave negative lens element, as recited in claim 36.

Response to Amendment

Applicant's amendment of claims 1 and 35 – 40 is sufficient in overcoming the rejection of Claims 1 – 9, 11, 12, 35, and 37 under 35 U.S.C. § 103(a) as being unpatentable over Hoshi, et al (U.S. Patent number 5,815,320), in view of Yamanishi (U.S. Patent number 6,094,313), and further in view of Official notice. *From the standpoint of manufacturing ease*, the prior art suggests placing the DOE on a surface having some curvature, but a large radius. In each of the embodiments of Hoshi, et al,

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the surface in the fourth lens group having the largest radius is an *image* side lens surface, rather than the object side lens surface now recited in independent claims 1, 35, and 37 - 40. With particular regard to claim 36, the recitation of the second lens unit as having "only one lens element, which is [that lens being] a biconcave negative lens element" distinguishes over Hoshi, et al, since each of the relevant embodiments employs a negative *meniscus* lens.

Applicant requested an evidentiary showing (MPEP 2144.03) that it was well known to use a low-curvature surface for DOE's. Nagata (U.S. Patent number 5,978,158; already of record) teach that it is difficult to form DOE's on a strongly curved surface, but teach that a base surface having some curvature offers the advantage of reducing aberrations by dividing the refractive power over multiple surfaces (Col. 10). Kamo (cited below) teach that it is easier to fabricate a DOE on a plano surface, but that, from the standpoint of coma aberration, it is best for the base surface to have some curvature (Col. 10, lines 49 - 56).

A further concern in choosing the surface for a DOE is that of diffraction efficiency, which is reduced as the incident angle is increased (see, Nagata, U.S. Patent number 5,978,158, Col. 10; Nagata, U.S. Patent number 6,157,494, "BACKGROUND OF THE INVENTION"). Thus, *from the standpoint of ghosting and flare*, it is best to locate the DOE on a surface where light is incident nearly normal to the surface, or at a very small angle. The examiner has no facility to identify a surface in the fourth lens group of Hoshi, et al for which a low incidence angle is maintained throughout the zooming operation. Thus, a rejection based upon this well-known criterion has not been entered.

Errata

In the last Office action (paper #11; March 28, 2003) a word processing error appears in the first whole paragraph on Page7, whereby the following text appears in the middle of a sentence:

“Claims 1,3, 4, 12, and 35 – 40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hoshi, et al (U.S. Patent number 5,815,320), in view of Yamanishi (U.S. Patent number 6,094,313).”

The examiner has made a pen-and-ink correction to the Office filewrapper. Applicant is asked to make a similar correction by deleting the aforementioned text.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Kamo (U.S. Patent number 5,978,158) disclose lenses having a diffractive optical surface.

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

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A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner Juba whose telephone number is (703) 308-4812. The examiner can normally be reached on Mon.-Fri. 9 - 5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mr. Drew Dunn can be reached on Mon.- Thu., 9 - 5.

The centralized fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306 for *all* communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.


JOHN JUBA
PRIMARY EXAMINER
Art Unit 2872

October 24, 2003